

REMARKS

Claims 1-7, 9-27, and 46-51, 53 and 54 are pending in the application, claim 52 being canceled herein. Claims 1 and 48 are the only independent claims.

Interview Applicants thank the Examiner for the courtesy of the telephone interview of October 5, 2004 that the Examiner had with the undersigned attorney for applicants. During that interview, the Examiner and the undersigned attorney discussed proposed modifications to claim 1 that would overcome the outstanding rejections of that claim. Claim 1 has been amended herein in accordance with that discussion. It was agreed that support for the present amendments to claim 1 are found particularly in the drawing.

Claims Objections

The Examiner points out that the numbering of the claims is not in accordance with 37 C.F.R. § 1.126 which requires that the original numbering of the claims be preserved throughout the prosecution of the application. In particular, the Examiner points to the reoccurrence of the number 50 in the previously submitted claims.

The Examiner has indicated that claims 50 (second occurrence), 51, 52, and 53 have been renumbered as claims 51, 52, 53, and 54, respectively. That numbering is assumed herein.

Claims Rejections - 35 U.S.C. § 112

Claims 1-7, 9-27, 46-53 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention.

In particular, the Examiner has pointed out that in the preamble of claim 1 the word “detention” should be “detection.”

Claims 1 and 48 have been amended to correct the typographical error pointed out by the Examiner.

Claim 1 stands rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential elements that are critical to the practice of the instant invention, such omission amounting to a gap between the elements. The Examiner also refers to the specification as teaching specifically that peristaltic flow rates of $-3\text{ }\mu\text{l/sec}$ through common tubing (0.02 inch tubing, 10 rpm or higher) have been determined to be compatible with flow cytometric detection. According to the Examiner, these elements are critical to the practice of the invention and are not recited in the rejected claims, in particular claims 1 and 48.

Applicants respectfully traverse this ground of rejection and maintain that the invention is broader than the particular embodiment referred to by the Examiner. Applicants' invention is more generally directed to applicants' insight and revelation that sample flow rates through flow cytometers *can* be increased, contrary to common practice and belief in the art, by inserting buffer bubbles in the sample flow stream. Applicants do not presume to dictate that there is only one set of flow parameters that permit the hydrodynamic focusing of gas-separated fluid samples in a flow cytometer. Instead, applicants respectfully submit that their invention, in the broadest sense, involves the realization and apprehension that hydrodynamic focusing of gas-separated fluid samples is possible. (See amended claim 1.) Applicants' invention is contrary to all teaching and practice in the art and therefore constitutes a patentable advance.

Applicants' invention more particularly provides that the gas of the separation bubbles have parameters of predetermined values to permit the hydrodynamic focusing of the fluid flow stream in a flow cytometer. For example, applicants' invention contemplates that hydrodynamic focusing will occur if the separation means includes tubing of a given size for introducing separation gas aliquots of a controlled volume into

a fluid flow stream with samples flowing at a specific rate, the given tubing size and the controlled volume and the specific sample flow rate all being predetermined to permit the hydrodynamic focusing of the fluid flow stream in the flow cytometer. (See amended claim 48.)

With respect to claim 50, the Examiner maintains that the recitation of “an inner diameter of less than about 0.03 inch” renders the claim indefinite because it fails to ascertain the requisite degree and scope of the invention. Specifically, the inner diameter encompasses 0.000 inch, which would appear to render the inventive tubing disfunctional.

Applicants respectfully traverse the Examiner’s specific rejection of claim 50. It is inevitable and understood that patent claims will inherently cover embodiments that cannot accomplish the intended result of the invention. Accordingly, claims drawn to chemical inventions inevitably cover chemical compositions that cannot be made or that cannot function to achieve the intended result. Analogously, mechanical claims cover embodiments whose dimensions would render them unsuitable for accomplishing the desired results. It is respectfully submitted that this common over-breadth of patent claims does not violate the Patent Statute. The claims are nevertheless definite. In the case of claim 50, one of ordinary skill in the art can easily determine whether the inner tubing diameter comes within the scope of the claim language. Moreover, the fact that claim covers inoperative tubing sizes is does not adversely affect competition or otherwise thwart the constitutional intent underlying the Patent Statute. Potential infringers of claim 50 are not apt to construct or commercialize inoperative embodiments. In a practical sense, therefore, it is immaterial that claim 50 might cover inoperative or disfunctional embodiments.

According to the Examiner, the recitation of the clause ‘said inner diameter is greater than 0.01 inch’ in claim 51 renders the claim indefinite because it fails to

ascertain the requisite degree and scope of the invention. Specifically, the inner diameter encompasses 10 inches or 100 inches, which would purportedly render the inventive tubing disfunctional.

Applicants respectfully contravene the Examiner's rejection of claim 51 under 35 U.S.C. § 112, second paragraph. As discussed above with reference to claim 50, it is an accepted practice that patent claims cover some embodiments that cannot accomplish the intended result of the invention (in addition to covering embodiments that do accomplish the intended results). Nevertheless, claim 51 is definite as written and does not adversely impact competition in the industry or the purpose of the Patents Laws.

With respect to claim 52, the Examiner points out that the word "certain" is non-idiomatic and therefore confusing. The Examiner suggests the word "specific" instead.

Claim 48, which now incorporates the language of claim 48, has been so amended to use the word "specific" pursuant to the Examiner's suggestion. Claim 54 has been correspondingly amended.

With respect to claim 53, the Examiner maintains that the recitation "said given size [of tubing] is less than about 0.03 inch" renders the claim indefinite because it fails to ascertain the requisite degree and scope of the invention. Specifically, the Examiner contends that the given size of tubing encompasses 0.0001 inch, which does not appear to be applicants' intent.

As discussed above with reference to claims 50 and 51, it is respectfully submitted that claim 53 is not indefinite because of the recitation alluded to by the Examiner. One of ordinary skill in the art will have no difficulty in determining that a flow cytometry apparatus containing a given size tubing will infringe claim 53. One of ordinary skill in the art will not construct or pursue embodiments that are covered by claim 53 but are not operative. Thus, the alleged overly broad scope of the claim is harmless.

Claims Rejections - 35 U.S.C. § 103

Claims 1-3, 5, 7, 9-12, 15-19, 26, 27, and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,853,336 to Saros et al. in view of U.S. Patent No. 6,159,739 to Weigl et al.

Claims 4, 6, 13, 14, 20-24, 46, 47, 49-50, 53, and 54 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,853,336 to Saros et al. in view of U.S. Patent No. 6,159,739 to Weigl et al. and further in view of U.S. Patent No. 6,132,685 to Kercso et al.

Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,853,336 to Saros et al. in view of U.S. Patent No. 6,159,739 to Weigl et al. and further in view of U.S. Patent No. 6,132,685 to Kersco et al., and additionally in view of U.S. Patent No. 5,788,927 to Farrell et al.

The Examiner has indicated that claim 52 contains allowable subject matter.

Claim 48 Claim 48 has been amended to incorporate the limitations of claim 52, which has been canceled. Claim 48 as so amended is therefore equivalent to claim 52 rewritten in independent form to incorporate all of the limitations of the base claim (claim 48) and any intervening claims (none). Pursuant to the Examiner's indication, amended claim 48 is allowable.

Claim 1 Applicants have amended claim 1 herein to specifically recite that the flow cytometer acts on the gas-separated flow samples from the pump and the means for introducing the gas bubbles. Thus, the objection of the Examiner to applicants' prior arguments is overcome. As indicated above, the Examiner agrees that claim 1 as amended herein distinguishes over the prior art and is allowable.

Conclusion

For the foregoing reasons, independent claims 1 and 48, as well as the claims dependent therefrom, are deemed to be in condition for allowance. An early Notice to that effect is earnestly solicited.

Should the Examiner believe that direct contact with applicant's attorney would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the number below.

Respectfully submitted,

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